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The Effectiveness of Community-Based Development in Poverty Reduction: A Descriptive Analysis of a Women-Managed NGO in Rural Pakistan

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The Effectiveness of Community-Based Development in Poverty Reduction: A Descriptive Analysis of a Women-Managed NGO in Rural Pakistan

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Abstract: To assess the targeting performance of community-based development activities and deduce the impact of such activities on poverty reduction, we implemented a survey of a non-governmental organization (NGO) in northwestern Pakistan. A distinct characteristic of this NGO is that it is managed mostly by women and its interventions are conducted through community-based organizations (COs), most of whose members are also female. This characteristic is rather unusual for a male-dominated society like Pakistan. Descriptive analyses of village, CO, and household level data shows that the NGO was able to target poorer villages. Villages with COs are characterized by lower adult literacy rates, lower availability of basic amenities, and higher susceptibility to natural disasters. With regard to household-level welfare indicators—such as consumption, women's empowerment, children's school enrolment, and the weight-for-age of infants—we found that the consumption levels of CO member households tended to be lower than that of households in non-CO villages. However, the difference between CO member households and non-member households in CO villages was insignificant, possibly owing to the mixing of the selection effect (i.e., poorer households are served by the NGO) and the causal effect of interventions on poverty reduction. On women's empowerment and child schooling, CO member households tend to perform better than other households, suggesting the favorable impact of the interventions and/or the self-selection of such households vis-à-vis program participation.

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1. Introduction

As a poverty-reduction strategy in developing countries, a larger emphasis has been placed in recent years on the role of the community (Binswanger-Mkhize et al., 2010). According to Mansuri and Rao (2004, pp.1-2), "community-based development" is an umbrella term for projects that actively include beneficiaries in their design and management, while "community-driven development" refers to community-based development projects in which communities have direct control over key project decisions. Such community participation is expected to contribute to the efficiency, accountability, and transparency of poverty reduction policies through the utilization of local information and resources, nurturing a sense of ownership (Bardhan, 2002). However, as Bardhan and Mookherjee (2000, 2005) show theoretically, such initiatives may be vulnerable to capture by local elites. Whether such initiatives improve the welfare of disadvantaged people thus becomes an empirical question. According to the results of the survey by Mansuri and Rao (2004), empirical evidence on whether community-based initiatives improve targeting and reduce poverty is mixed but tends to be positive within an enabling institutional environment. At the same time, Mansuri and Rao (2004) point out the difficulties inherent in establishing causality.

In South Asia today, where programs that advance community roles were being implemented as early as in the 1940s (Binswanger-Mkhize et al., 2010), community-based development activities aimed at fighting persistent poverty are commonly found. However, Pakistan, which is also located in South Asia, is lagging behind in this aspect, and economic as well as human development in Pakistan requires a massive effort for improvement. Successive regimes in Pakistan, both democratic and non-democratic, have lacked the capacity and political will to extend basic amenities to its inhabitants. Since the 1970s, non-governmental organizations (NGOs) have entered to fill the gaps in sectors where the government lacks either the capacity or political will for improvement, but not much success has been seen from them. It may be speculated that underlying this situation is a society with an unequal distribution of income and assets, where the core network is based on familial, clan, and tribal relations; it may also have limited historical experience in cooperation with regard to community-based organizations (CBOs) in development efforts (Kurosaki, 2006). Nevertheless, microeconomic research on community-based development activities in Pakistan has been limited, save for a few studies (e.g., Khwaja, 2001; Kurosaki, 2005; Cheema et al., 2006).

To help fill this gap in the literature, this paper attempts to assess the effectiveness of community-based development activities undertaken by an NGO in Pakistan that aims at reducing poverty. More specifically, the objective of this paper is to characterize the participants of the NGO activities, using descriptive tools. The NGO we study works in disaster-prone areas. It is managed mostly by women, whose interventions are conducted mainly through female

CBOs (known as community organizations [COs] in the study area). These characteristics make this study especially informative in understanding the role of community-based initiatives in undertaking poverty reduction. In the analysis, on the one hand, villages with COs are compared with villages without COs; on the other, households that are CO members are compared with those that are not, in both types of villages.

The rest of the paper is organized as follows. Following this introductory section, Section 2 describes the study area and survey design. Section 3 provides the results of the descriptive analysis, in terms of village-level, CO-level, and household-level analyses. Section 4 provides a summary and conclusion.

2. Study Area and Survey Design

2.1 Background of the Study Area

Pakistan suffers from underdevelopment in terms of both economics and human development. For example, UNDP (2010) ranks Pakistan as the 125th of 169 countries in its Human Development Index, with mean years of schooling at only 4.9 years and per-capita gross national income at $2,678 (in purchasing power parity [PPP] dollars of 2008). Of the total population of Pakistan (estimated at 173.5 million in mid-2010), approximately one-quarter was estimated to live below the poverty line in the mid-2000s, but the poverty incidence was expected to have risen in the 2008–2010 period, owing to rising international grain prices and the devastating floods of 2010 (GOP, 2011). Most of its poor population has no access to efficient sources of credit (World Bank, 2002).

Given the Pakistani government's failure to deliver basic services to its poor, NGOs have been serving this disadvantaged segment of the population (ADB, 1999). NGOs in Pakistan can be traced back to 1947, when the country achieved independence from the United Kingdom. These early NGOs had a limited scope, that is, assisting those who had migrated from India. During the 1970s and 1980s, there was rapid growth in the number of NGOs in Pakistan; the major reason behind this mushrooming growth was an inflow of generous international funding, as a reward for allying itself with the United States and its allies. During this period, some of the NGOs played a vital role in creating awareness among the general public regarding social issues such as basic human rights, developing the roles of women, and overpopulation, while others provided basic amenities and essential services in remote areas of the country.

During the 1990s, the services offered by NGOs expanded to include basic health and education services; the provision of training for income-earning skills; awareness campaigns; the provision of community-managed water and sanitation services, through microinfrastructure projects (MIPs); credit access to the otherwise unbankable, through microfinance (MF) programs; and targeted poverty alleviation programs (ADB, 1999). With the expansion of their

activities, NGOs in Pakistan also began to place more emphasis on community-based programs. At the same time, the government of Pakistan also sought to increase the role of communities in development. For instance, under the military regime led by General Pervez Musharraf, who was in power from 1999 to 2008, devolution policies were introduced, whereby the role of local governments was enhanced and a new scheme of community-based development called the Citizen Community Board (CCB) was introduced (Kurosaki, 1995; 1996). Several Pakistani NGOs with previous experience in community-based development were involved in running the CCB schemes under the Musharraf regime. Nevertheless, with respect to Pakistan in particular, rigorous economic research on the impact of such NGOs and the conditions underlying their success or failure is lacking.

2.2 The NGO

For empirical analysis in this paper, we selected an NGO called the Pakistani Hoslamand Khawateen Network (PHKN). Established on June 10, 2000, and led by Mrs. Irum Fatima (current president), PHKN has its headquarters in District Haripur of Khyber Pakhtunkhwa (KPK),[1] and it serves the surrounding areas. PHKN's first community-based intervention was implemented in 2000 in a small village called Pind Hashim Khan of District Haripur. At that time, PHKN was known as the Pind Hashim Khan Network. The network was composed of a small group of women with the shared goal of uplifting the lives of their fellow women, both socially and economically. With funding from international as well as domestic donors, PHKN has grown rapidly since then and now operates in several districts.[2] Nevertheless, its main activities are focused in District Haripur.

The total area of District Haripur is 1,725 km^2. According to the 1998 Census,[3] the total population of the district was 692,228, the average annual population growth rate was 2.2%, and the district's population density was 400 persons/km^2.[4] According to the same census, the literacy rate for the district was 53.7% (70.5% for males vs. 37.4% for females), and approximately 76% of the housing units had electricity service. The dwellers of the district have poor access to basic civic facilities and amenities.

[1] District is a basic unit of local administration under a province in Pakistan, which is a federation state composed of four provinces. Khyber Pakhtunkhwa (KPK) is one of the four provinces, formerly known as the North-West Frontier Province (NWFP). In April 2010, the constitution of Pakistan was amended and the former NWFP was renamed Khyber Pakhtunkhwa.

[2] At the time of our survey, PHKN had its activities in Districts Haripur, Abbotabad, Mansehra, Kohistan, and Lower Dir of KPK. PHKN also had limited outreach in Federally Administered Tribal Areas (FATA) of Pakistan.

[3] This is the most recent population census in Pakistan; the next census is being carried out in 2011.

[4] According to KPK authorities, the population of the district in 2010 was estimated to be 1,265,799. This figure was culled from the KPK's official website (http://www.khyberpakhtunkhwa.gov.pk/aboutus/Area-Population.php, accessed on May 15, 2011).

According to a government source,[5] more than 30% of the district's population lives below the poverty line. Like the rest of the country, women's participation in the labor market is low, owing to low investment in human capital, negative social biases and prejudices, controversial and discriminatory policies and laws, restrictions on female mobility, and the internalization of patriarchy by women themselves.[6] Almost two-thirds of the district area is rain-fed, and the district is prone to natural as well as manmade calamities. The last few decades have witnessed serious ecological degradation due to illegal timber-harvesting, deforestation on mountains and hillsides, rangeland degradation, over-cultivation, uncontrolled grazing, low productivity in agriculture and livestock, poor water resource management, and the like. This degradation has resulted in frequent flash floods, landslides, and attacks by wild boars, affecting the lives of hundreds of those living in the district.

Working in such a difficult region, PHKN appears to be praiseworthy for its focus on women and community-based interventions. However, as emphasized in the introduction, such interventions may be vulnerable to capture by local elites; especially considering the social background of these women who lead the NGO, there is a high likelihood of such a capture. Therefore, it is of great interest to examine empirically whether PHKN's initiatives have improved the welfare of disadvantaged people. In geographical areas served by PHKN, PHKN is by far the dominant NGO. For this reason, we can safely attribute our empirical findings solely to PHKN.

2.3 The Process of Community-Based Development

PHKN adopts a community-based development approach, under which dwellers of a village or rural community are organized into CBOs. In the case of PHKN, such CBOs are called COs. COs are organized before any kind of intervention takes place in a village or rural community. Owing to social and cultural constraints, there are separate COs for males and females. In a small village, one female CO and one male CO are established, at most; in a large village, there may be several female (male) COs, but each CO usually covers one or a few *Mohallas* (geographical units within a village), each of which is distinct from other *Mohallas* covered by COs in the same village. Each CO has 16–40 members. An important feature of PHKN is that almost three-quarters of its COs are run by women, which is significant in the context of the male-dominated society of Pakistan.

A typical PHKN intervention has the following steps. First, PHKN makes its initial contact with a village in a meeting with peer leaders (e.g., village elders, school teachers, local

[5] Cited from http://www.khyberpakhtunkhwa.gov.pk/aboutus/Area-Population.php (accessed on May 15, 2011).

[6] Cited from http://www.statemaster.com/encyclopedia/Haripur-District and http://www.sungi.org/situation_analysis_of_district_haripur.html, accessed on May 11, 2011.

elected members, and religious leaders). Contact is made at the same time an initial assessment of the area is done, during which general information on the village society and on its development needs is collected. The introduction of PHKN to a village can be made through one of three routes. First, PHKN staff members find potential villages from available secondary information. Second, the concerned local administration (e.g., social welfare, agriculture, health, education, and livestock departments) or local politicians may ask for a PHKN contact. Third, the peer leaders of a village may ask PHKN for an initial contact. The first route is employed most frequently.

After the initial contact, PHKN holds a series of meetings with peer leaders, local communities, and stakeholders. This stage is called the 1st Dialogue, and it is recorded in the PHKN log books. Subject to satisfying the minimum criteria qualification and eliciting the willingness of a considerable number of villagers, a CO is formed. This stage is called the 2nd Dialogue. During the 2nd Dialogue, community development tools such as participatory rapid appraisal (PRA) and village resource mapping are employed to identify developmental needs and priorities, and CO office bearers (the president, secretary, and activists) are elected and trained on how to run a CO (i.e., record-keeping, accounting, and savings management). All interventions (such as provision of MF, human resource development [HRD] trainings, MIPs, etc.) undertaken by PHKN are categorized as the 3rd Dialogue.

After COs are established in this way and registered by PHKN, they begin to perform routine activities. Usually, COs have a monthly meeting called the general body meeting (GBM), where CO members discuss PHKN activities, prevailing issues in the village, and future plans to address issues. CO members also deposit savings during these meetings. CO savings are recorded in individual savings accounts. Besides the training mentioned above, all COs are provided with HRD training, the emphasis of which is on the development of income-earning skills and microenterprise management; the exact human resource training received differs from CO to CO, reflecting each community's unique needs. In villages with deficits in educational institutions, PHKN sometimes provides assistance to community-based schools. Similarly, in villages with poor health facilities, PHKN may train and mobilize informal health workers, such as traditional birth attendants (TBAs). PHKN staff members regularly visit each CO, with the average visit frequency being once every two months. During these visits, PHKN personnel discuss various issues with CO members while also checking CO records.

Two major interventions by PHKN that involve large amounts of money are MF and MIPs. When an MIP is sanctioned at a CO's request, the CO needs to contribute around 20% of the total cost. When a CO requests an MF or MIP, PHKN considers the amount of total savings from CO members as an efficiency parameter in deciding whether or not to advance an MF

and/or sanction an MIP.[7] CO savings are sometimes used to finance CO members' due contributions in running MIPs. With the consent of the majority of CO members, CO savings can also be used in internal lending, to assist a CO member who faces financial difficulties; by the time our survey had been executed, however, such internal lending had yet to happen.

As this description of intervention steps shows, the link between PHKN personnel and village peer leaders, as well as that between the peer leaders and general villagers, play a key role in PHKN interventions. These characteristics suggest the potential for elite capture, making our investigation an interesting case study.

2.4 Survey Design

Given the aforementioned PHKN intervention steps, we adopted a three-tier survey strategy to collect objective data, at the village, CO, and household levels. For the village and CO surveys, we attempted a census survey, while for the household survey, we adopted a random sampling design. Structured questionnaires in Urdu were prepared after pretests and were subsequently used for data collection. The questionnaires consisted of various open- and close-ended questions. The survey was implemented in two phases covering the project area of PHKN − the first phase (September–October 2010) for the village and CO survey, and the second phase (November–December 2010) for the household survey.

In the village survey, knowledgeable persons such as the elected members (councilors) of union councils, schoolteachers, and lady health workers were interviewed. The survey attempted to cover all villages that were (potential) target areas of PHKN. Most of PHKN interventions are in District Haripur, and so we attempted to survey all 101 villages in that district. However, for administrative reasons, we were not able to obtain valid information from two villages. In addition, since PHKN activities target several neighboring villages, two villages in District Mansehra and four villages in District Abbotabad were also surveyed. Therefore, we gathered 105 observations of villages, of which 99 are located in District Haripur.

In the CO survey, presidents and/or secretaries of the COs were interviewed, with cross-checking with log books and administrative records maintained by PHKN. We successfully collected information from all 90 COs registered with PHKN. All 90 COs were located in District Haripur.

In the household survey, two types of households were randomly chosen: those who have been members of PHKN activities and those who have not yet been involved therein. The first category contains "treatment" households, denoted by T below. The second category contains "control" households. Two types of control households are assumed: Control 1 (C_1),

[7] On the other hand, where there is a dire need, the need consideration may override the allocation principle, based on the CO savings. We observed a few cases where a CO with a poor savings record but which had such need received PHKN services.

composed of non-member households in CO villages; and Control 2 (C_2), composed of those who live in non-CO villages.

Regarding type-*T* households, in the first stage of sampling, 50 sample COs of the 90 were chosen, and in the second stage of sampling, we attempted to collect information on five-member households, randomly chosen from the member list. We successfully surveyed five-member households, except for one CO where we surveyed four members. Therefore, our sample size of *T* households is 249.

To collect information on type-C_1 households, we surveyed non-member households living in the village (or *Mohalla*, if there were two or more COs in the village) where *T* households were surveyed. The sample for C_1 households was randomly selected from the electoral list of the villagers, at the rate of one per one type-*T* household. In two villages with three COs (with two COs in one village and one CO in other), no control households were surveyed, since the majority of households in the villages were already CO members. In other cases, five non-member households were surveyed in each village (or each *Mohalla*, when the village was large and had several COs), except for one case where four non-member households were surveyed. This resulted in a random sample of 234 type-C_1 households.

Regarding type-C_2 households, we randomly selected five households from 20 villages that had no COs; these 20 villages were randomly selected from the village list. The sample of households was randomly selected from the electoral list of villagers. Thus, the sample size of C_2 households is 100.

3. Descriptive Analysis

3.1 Comparison of CO Villages and Non-CO Villages

3.1.1 Empirical strategy

In the village survey, we collected more than 200 variables that characterize a village. Using this dataset, this subsection compares the (unconditional or conditional) mean of several variables among villages with a CO of PHKN ("CO villages") and villages without ("non-CO villages").

When the variable of concern is predetermined at the time of PHKN intervention, the difference can be attributed to the selection into PHKN treatment. Conceptually, the selection effect is a mixture of the targeting by PHKN towards villages (*endogenous placement*) and the response of villages to PHKN in the form of CO formation (*self-selection*). The dataset, however, limits our ability to rigorously identify either the endogenous placement effect or the self-selection effect. Therefore, our focus is on quantifying the net effect of the two; we will interpret loosely that the targeting is towards the poor if CO villages are poorer than non-CO villages, according to the distribution of such predetermined variables. This is because what

matters, on a practical basis, in assessing the success of targeting is the net result. In addition, considering the PHKN's process of community mobilization described in subsection 2.3, by altering the definition of "CO villages" and "non-CO villages" (explained below), we can shed light on which of the two (i.e., PHKN's placement vs. villages' self-selection) is likely to be more important.

When the variable of concern is potentially endogenous to PHKN intervention, the difference can be attributed to the selection into PHKN treatment (both endogenous placement and self-selection) and the causal impact of PHKN treatment on village-level indices. Since our survey is not designed as a randomized controlled experiment and no event could be safely considered a natural experiment for the PHKN treatment variation, it is not possible to identify behavioral impacts from the selection effects. In this paper, we are interested solely in quantifying the net effect.

3.1.2 Classification of villages

Of the 105 village observations, 99 are in District Haripur; the rest are in Abbotabad or Mansehra. One concern could be that the six villages in Abbotabad or Mansehra are different from the 99 villages in Haripur, in terms of some unobservable factors. To address this concern, when conducting the bivariate comparison of villages with CO and non-CO villages, we use the full sample as well as the Haripur subsample for the robustness check; in conducting the multivariate regressions, we include dummy variables for Abbotabad and Mansehra.

With regard to definitions of CO vs. non-CO villages, our default definition is based on the PHKN list of villages with a CO or similar activities. The list includes those villages currently lacking registered COs. We check the robustness with respect to the exclusion of such villages from the category of CO villages (a narrower definition of "CO villages"). We use the first definition as the default, since we expect this categorization to capture better the essence of PHKN targeting. As another measure, we can expand the category of CO villages by adding those villages that were contacted by PHKN but failed to form a CO and are not listed in the PHKN list of villages with a CO or similar activities (a wider definition of "CO villages"). To characterize pure placement by PHKN, this measure may be better than the default definition. Therefore, we will use the wider definition as another robustness check.

If our sample size were larger, we could compare four types of villages directly: those villages contacted by PHKN but failed to form a CO, those villages listed in the PHKN list of villages with a CO or similar activities but currently lacking a registered CO, those villages with currently registered COs, and the rest. However, since the sample size is small (i.e., each category with 20, 16, 24, and 45 observations), we adopt the dichotomous classifications with 40 CO villages (=16 + 24) as the default definition, 24 CO villages as the narrower definition,

and 60 (=20 + 16 + 24) as the wider definition (see the first rows of Table 1).

3.1.3 Comparison of CO and non-CO villages

Table 1 presents summary statistics for all 105 villages. When there was no variation across villages—as was the case with some variables—such variables are not included in the tables, but some of them are mentioned in the text below. The size of the villages in terms of population[8] ranges from 140 to 8,245. More than 50% of the villagers cite agriculture as their main occupation, followed by various services accounting for approximately 20%. The occupational structure thus conforms with nationwide occupational compositions. Furthermore, the occupation structure has variation across villages—for example, the share of agriculture ranges from 0% to 92% and its standard deviation is 22 percentage points. The average literacy rate among the villages is 54%, which also conforms with provincial or national-level averages. Literacy rates also vary across villages, in the range of 5–95%. Of the 105 villages, only 28% are connected to irrigation canals; the rest are rain-fed, implying their agricultural production may suffer from rainfall fluctuations if tubewell irrigation is not adequate.

<Bivariate comparison>

In Table 2, we report the means of key variables, separately for CO villages and non-CO villages, with statistical tests for the equality of means. To check the robustness of the comparison, we use two sets for non-CO villages: 65 non-CO villages, regardless of district, and 59 non-CO villages in Haripur District. As shown in Table 2, the exclusion of non-CO villages from the Abbotabad and Mansehra villages slightly weakens the contrast between CO and non-CO villages. Appendix Table 1 shows the contrast based on the narrower or wider definition of CO villages. In what follows, the robust, significant contrast is discussed.

Among demographic factors, CO villages tend to have lower adult literacy rates (i.e., by around 10 percentage points) than non-CO villages. Village sizes were all similar. The occupational structure in non-CO villages tended to be more diversified, suggesting a higher living standard, but the difference is significant only when we include villages in Abbotabad and Mansehra.

Access to basic amenities like clean drinking water and market-access roads is similar between the two sets of villages, while a clear distinction between CO and non-CO villages is found with respect to the availability of natural gas, cable TV, and internet connections. Non-CO

[8] This information was obtained from the office of union councils. A union council is the smallest unit of local governance, and each covers 10–25 villages. It consists of elected representatives from constituencies spread across the union council. Besides legislative functions, union councils are responsible for local developmental work and the maintenance of records of basic socio-economic information of the villages under its jurisdiction.

villages have much better to access to these facilities, which are generally considered amenities available only in economically better-off areas. Although the statistical significance level was not very high, non-CO villages tend to have more grocery shops called *Karyana* shops, and fruit shops. This is also an indication that COs are more likely to be formed in under-developed villages.

Access to basic health facilities shows that the two types of villages are similar in terms of formal basic health facilities. The better access to informal basic health facilities—namely, trained TBAs—could be attributable to efforts by PHKN to improve access. We found a similar pattern with regard to education facilities. As far as formal education is concerned, there is no significant difference between CO and non-CO villages; with regard to informal education (community-based schools), however, CO villages have more facilities than non-CO villages.

As an indicator of local governance, we collected information on existing dispute-settlement forums (DSFs); the majority of villages have some kind of DSF. There is no difference between CO and non-CO villages with respect to the existence of a traditional DSF called a *Jirga* (a council of local elders). On the other hand, the prevalence of non-traditional or parallel DSFs is significantly higher in CO villages than in non-CO villages; this finding appears to suggest the facilitating role of PHKN.

Finally, considering the huge shock to Pakistan when inflicted with unprecedented flooding in July–August 2010,[9] we collected information on the susceptibility of villages with respect to natural disasters. The incidence of flood damage was higher among CO villages than in non-CO villages. This suggests that PHKN targets villages that are more prone to natural disasters.

As shown in Appendix Table 1, the use of the wider definition of "CO villages" does not alter the results qualitatively. This can be interpreted as suggestive evidence that a major component of the net correlation between village characteristics and PHKN interventions is the placement effect (i.e., pure targeting by PHKN), rather than village self-selection in forming a CO.

<Multivariate comparison>

A bivariate comparison of CO and non-CO villages thus shows that PHKN targets poorer villages in the sense of lower adult literacy rates and low availability of natural gas, cable TV, and internet services. PHKN also targets villages that are more prone to natural disasters.

[9] In July–August 2010, Pakistan experienced "the worst floods in its history.... The floods have affected 84 districts out of a total 121 districts in Pakistan, and more than 20 million people—one-tenth of Pakistan's population.... More than 1,700 men, women and children have lost their lives, and at least 1.8 million homes have been damaged or destroyed" (UN, 2010, p.1).

On the other hand, CO villages seem to enjoy better access to community-based schools, TBAs, and non-traditional DSFs. Our field observations suggest that this pattern indicates the positive impact of PHKN, rather than mistargeting.

To examine the difference between CO and non-CO villages from a slightly different angle, multivariate comparison is attempted; our econometric model is not intended for causal analysis but for descriptive purposes. Therefore, we adopt a simple linear probability model with the CO-village dummy as the dependent variable and the selected variables in Table 2 as explanatory variables.[10] Because of the small sample size and inherent multicollinearity problems, we reduce the number of explanatory variables by excluding some variables that are associated with there being no difference in the bivariate comparison.

The regression results are reported in Table 3 and Appendix Tables 2–3. Model 1 uses variables that, from PHKN's viewpoint, are safely regarded as predetermined, so that we can discuss the selection effect only. Models 2–5 include potentially endogenous variables that might capture the behavioral impact of PHKN. The potentially endogenous variables include *dsf* (non-traditional DSFs), *cbsch* (availability of community-based schools), and *tba* (availability of TBAs). All three of these activities are promoted by PHKN.

The 15 specifications in the three tables robustly support the bivariate results that PHKN targets poorer and more vulnerable villages. However, the statistical significance level varies from that suggested in the bivariate results. Strikingly, once controlling for other factors, literacy rates have no statistically significant effect on the presence of a CO. For other variables—like the availability of natural gas, internet access and grocery shops, and disaster susceptibility—the pro-poor targeting pattern remains intact and statistically significant in several (but not all) specifications. In this sense, support from the multiple regression for pro-poor targeting is slightly weaker than that suggested in the bivariate analysis.

One variable that becomes significant at this point is the length of the road connecting the village to a major market (*rd_length*). It has a significantly negative coefficient, implying that CO villages tend to be closer to a market than non-CO villages, after controlling for other factors. This finding can be interpreted as evidence of cost minimization behavior by PHKN, rather than evidence of mistargeting.

When each of the three potentially endogenous variables (*dsf*, *cbsch*, and *tba*) is added to the regression model, it has a positive and statistically significant effect, suggesting that the bivariate comparison results are robust to controlling for other variables. Judging from observations in the field, we interpret this as suggestive of the causal impact of PHKN interventions, rather than mistargeting. Given the data limitation, rigorous evidence for this

[10] The probit results are very similar to those reported in this paper. To be consistent with the following tables, we report results based on the linear probability model.

claim remains to be seen and is left for further research. The addition of these potentially endogenous variables does not qualitatively affect the coefficients on more predetermined variables (i.e., compare Model 1 with Models 2–5).

In summary, the above results demonstrate a tendency for a village to form a CO if the village is near an urban area, lacks amenities associated with better-off areas, and is prone to natural disasters. Therefore, we can conclude that PHKN targets the poor, on the whole.

3.2 NGO Interventions at the CO Level

3.2.1 Empirical strategy

The 90 COs in our dataset are not homogeneous, in terms of either their structure or their performance. Of about 150 variables we collected for each CO, Table 4 reports the summary statistics of the major variables in two broad categories: those characteristics that were fixed at the time of CO formation and those that represent the performance of collective action following CO formation. We are interested in identifying what characteristic is associated with more successful collective action by a CO.

Therefore, we first discuss the summary statistics of these two groups of variables, for the entire 90-CO sample; this discussion is followed by a comparison of male and female COs. We then regress some of the second group of CO variables (i.e., CO performance indicators) on village characteristics and the first group of CO variables. Finally, since the CO performance indicators are mutually dependent, we look at the bivariate correlations among them. Ideally, if we have instrumental variables (IVs) that affect one of these CO performance indicators without affecting the others, we can cleanly identify the impact of that endogenous variable on other endogenous variables. However, we are not able to find such an IV in our dataset. Instead, we look at the net correlation to shed light on the interrelations among the performance indicators, first by using the observed values and then by using the regression residuals, after controlling for observable characteristics.

3.2.2 Characteristics of COs

As shown in Table 4, the average membership of a CO is 23 persons (range, 16–40). Male COs account for 26% of all COs; the rest are female. It takes on average 50 days for villagers to form a CO after the initial contact with PHKN (the variable named *incub_per* in the table). The incubation period ranges from one day to 398 days (about 13 months). As shown with the variable named *co_age*, some of the COs are very old, dating back to the days before the formal establishment of PHKN. The average CO age is 45 months.

We collected detailed information regarding CO leadership, that is, president, secretary, and activists. The average age and education of the president are 39 and five years, respectively.

The average ages of the secretary and the activist are 34 and 36 years, while their average schooling years were seven and six years, respectively. The ages of the president and secretary highly correlate (correlation coefficients are 0.486, statistically significant at the 1% level), and as do the education of the president and the secretary (correlation coefficients 0.458, significant at the 1% level). On the other hand, the age and education of activists do not correlate with those of presidents/secretaries. Therefore, in the CO-level regression analysis below, we combine the age (education) of the president and the secretary by using their respective mean values.

PHKN activities are classified into three broad types[11]; some of their characteristics are shown in Table 4. The first type of activities is savings. As shown in Table 4, the average amount of savings among COs is in excess of Rs. 7,800, while the average per-capita savings is over Rs. 350.[12] The second type of activities includes the implementation of MF and MIPs. Both of these are important, since they involve a large amount of PHKN resources and CO collective action. In all, 27% of COs have availed themselves of MF credit thus far (Table 4). Credit is given to individual members, with the average loan size being over Rs. 6,500. Approximately 36% of COs benefitted from an MIP, with the average number of completed projects at 0.4 (Table 4). The size of these MIPs ranges from Rs. 175,000 to Rs. 855,000, with its mean at Rs. 500,000. One of the popular MIP fields is water/sanitation. When an MIP is implemented in a village, not only CO members but also non-members benefit from the project. It is estimated that the number of non-member beneficiary households are almost double the number of beneficiary member households. The third type of PHKN activity is HRD training. If we pool all kinds of HRD training, it becomes clear that all COs have received such training. On average, six training sessions are provided per CO. In Table 4, we distinguish three types of HRD training: leadership and managerial skill development training, non-conventional HRD training, and natural disaster management training. The average expenditure per CO for HRD training is in excess of Rs. 300,000.

In Table 5, male and female COs are compared on the basis of these variables. As shown in the table, the number of male COs tends to be larger than that of female COs, by two persons; the difference is statistically significant. There is no statistically significant difference in the length of the incubation period, while male COs tend to be more recently established than female COs. Male CO leaders tend to be older and more educated than female CO leaders. The education gap may simply reflect the general gender gap in education in the region.

[11] In addition to these three, DSFs are important CO activities facilitated by PHKN. Common social forums for each CO were surveyed in detail, including mosques, *Bethak* (a traditional guesthouse), *Hujra* (a traditional place of socialization used by men), etc. Some variation also exists in the use of local DSFs. The quantitative analysis of these CO performance indicators is left for future analysis.

[12] "Rs." denotes the currency as Pakistani Rupees. At the time of our survey, US$1.00 = Rs. 86.

Looking at CO performance, there is no statistically significant difference in the level of savings, either total or per capita. MF has not been extended to male COs, and MIPs are also concentrated among female COs. The absolute number of conventional training sessions is the same for male and female COs (not reported in the table). A large number of female COs received HRD training on poultry farms, in nursery-plant raising, to educate and mobilize TBAs, in agro-based cottage industries, and with respect to income-earning skills. For female COs, PHKN also provides HRD training on family planning. The overall patterns thus vividly show PHKN's orientation towards women.

3.2.3 Correlates of CO savings, microfinance, and micro-infrastructure projects

Does the gender contrast found in the bivariate comparison hold even when we control for other factors? Under this motivation, we run CO-level regression models. Such models are expected to clarify the correlates associated with the implementation of MF and MIPs on the one hand and the level of CO savings on the other. The explanatory variables we use are some of the village characteristics used in Table 3, as well as certain predetermined CO characteristics such as the number of CO members, incubation period, CO's age, and CO leadership's human capital.

Table 6 presents the estimation results.[13] Regarding the determinants of CO savings per capita, the village-level variable for the availability of clean drinking water has a positive and significant coefficient (Model 1, *saving_pc*), suggesting that savings are higher in COs located in villages that have better health facilities. However, the coefficient becomes statistically insignificant once CO-level explanatory variables are added (Model 2, *saving_pc*). Savings are more concentrated in COs with a smaller number of members (probably because members do not feel the social pressure to save regularly, if a CO has many members), with a longer incubation period (we do not have a clear interpretation for this finding), and with elderly and educated leaders (suggesting higher enforcement of saving practices within the CO). There is no significant difference between male and female COs, as is the case with the bivariate comparison.

With respect to project implementation, there is an interesting contrast regarding village demographics. While the literacy rate has no significant effect on the implementation of MF, the variable has a positive and significant effect on the implementation of an MIP. If the literacy rate were to increase by 1%, then the probability of having an MIP is predicted to

[13] When the dependent variable is either *mf* or *mip*, we estimate a linear probability model with a dummy variable as the dependent variable. As an alternative specification, we attempt probit models as well. However, probit results in this case are highly unstable, probably due to the small-sample bias. For this reason, we report the results based on the linear probability model.

increase by about 1%.[14] This positive relationship with the literacy rate may imply that the implementation of an MIP requires villagers who have a good education. Furthermore, the village's proportion of population in agriculture (*agri_prof_prc*) has a positive effect on MF, but not on MIP. Moreover, the coefficients on the road length to a major city (*rd_length*) show no statistically significant effect on MF, but a negative and significant effect on MIP. In general, traditional MF credit—such as that provided by Bangladesh's Grameen Bank—is used to establish small businesses like rice husking and bamboo weaving, which are market-oriented. However, in the context of our survey area, our results for *agri_prof_prc* and *rd_length* appear to suggest that the purpose of MF projects might not have been for starting a small business. Rather, the credit may have been used to smooth consumption vis-à-vis seasonal income fluctuations. Finally, we interpret the negative coefficients of road length in the MIP regression as a reflection of cost minimization, from PHKN's viewpoint.

The effects of CO-level variables on MF or MIP dummies also show an interesting contrast. Both MF and MIP probabilities are lower among COs with more members and younger COs, but this is statistically significant only with respect to MIP probability. This could be due to the hurdle of the 20% contribution of CO members in implementing MIPs. Among COs with many members or those established very recently, it is more difficult for CO members to agree with the implementation of an MIP that incurs a substantial cost among members. The leaders' human capital has a positive and statistically significant effect on MF only. This may suggest that CO members' demand for credit increases when the CO is led by experienced leaders; alternatively, it may simply reflect PHKN's screening process, wherein the NGO allocates MF only to those COs managed by experienced leaders.

3.2.4 Interrelations among CO savings, microfinance, and micro-infrastructure projects

In screening applications from COs requesting MF or an MIP, PHKN uses the information pertaining to CO savings (see subsection 2.3). This screening process automatically implies the positive effect of *saving_pc* on the probability of receiving MF or an MIP. On the other hand, *saving_pc* is endogenously determined by CO members, implying that an ordinary least squares (OLS) model for MF or MIP that extends the model in Table 6 with *saving_pc* as an additional explanatory variable cannot provide an unbiased estimate of causal effect.

Given this difficulty, we simply examine the bivariate relation among *saving_pc*, MF, and MIP. The top-left portion of Table 7 shows that the three correlate highly; all three correlation coefficients are statistically significant at the 1% level. This positive correlation is a mixture of effects due to the screening process, observable characteristics that affect the three

[14] Note that the linear probability model gives good estimates of the partial effects on the probability of interest, but only near the center of the distribution of explanatory variables.

variables in the same direction, and unobservable characteristics that affect the three variables in the same direction. As an indicator of the strength of the correlation, the bottom-left portion of Table 7 shows the bivariate regression coefficient in determining the probability of MF or MIP. The coefficient shows that if per-capita CO savings were to increase by Rs. 100, the probability of the CO receiving MF would increase by 9.6 percentage points, while the probability of receiving an MIP would increase by 8.3 percentage points. Thus, the correlation is very strong.

To exclude from this correlation effects due to observable characteristics that affect the three variables in the same direction, we use the fitted residuals of *saving_pc*, MF, and MIP, from the regression results reported in Table 6 (Model 2 specification). The top-right portion of Table 7 shows that, at this point, the correlation coefficients between MF and MIP have become smaller and statistically insignificant. The insignificant correlation between the MF and MIP residuals implies that most of the observed correlation was due to the effects of observable characteristics that affect MF and MIP dummies in the same direction.

Although the statistical significance level diminishes, the correlation between *saving_pc* and MF and that between *saving_pc* and MIP remain significantly positive. As shown in the bottom-right portion of Table 7, if per-capita CO savings were to increase by Rs. 100, the probability of a CO receiving MF would increase by 5.1 percentage points, while that of receiving an MIP would increase by 3.8 percentage points. Clearly, the magnitudes are still large. Although we cannot deny the possibility that this remaining correlation was due to unobservables that affect the three variables in the same direction, it is likely that the correlation reflects PHKN's screening process.

In summary, the above results demonstrate that COs that perform well in one aspect tend also to perform well in other aspects, and that PHKN rewards such COs through the allocation of MF or MIPs. If such unobservables that are associated positively with performance take larger values among poorer households, then the process is pro-poor, reinforcing the assertion that PHKN's targeting is pro-poor. Unobservable factors like the motivation to move out of poverty may fit with this story. On the other hand, unobservable factors like entrepreneurship may contradict the story (because non-poor households tend to perform better in CO activities, under such a scenario), making the process anti-poor and thus weakening the assertion that PHKN's targeting is pro-poor. With the current dataset, we are not able to distinguish the two, leaving the analysis for future research.

3.3 How Different Are CO Households from Non-CO Households?

3.3.1 Empirical strategy

In the household survey, we collected more than 500 variables that characterize each of the 583 sample households. The household dataset also contains individual-level information

such as age, sex, relation to the household head, work status, education status, and health status, and covers 3,600 individuals. We use this information to compare welfare indicators of CO and non-CO households in this subsection. Similar to our empirical strategy in the village-level analysis, our focus is on quantifying a net effect of various factors. To interpret the net effect, we need to be clear about what the various factors are.

As before, the observed difference can be attributed to the *selection* into PHKN treatment and the *causal impact of treatment on households*. However, the selection component now includes an additional factor: in addition to PHKN's *endogenous placement* and villages' *self-selection* in forming a CO, there is *household-level self-selection* in joining the CO, conditional on the successful formation of a CO in the village.

The comparison of type-T households (CO member households) and type-C_1 households (non-member households in CO villages) gives us suggestive evidence for the net effect of the causal impact of treatment and the household-level self-selection. The comparison of type-T households and type-C_2 households (households in non-CO villages) gives us suggestive evidence for the net effect of the causal impact of treatment, PHKN's endogenous placement, village-level self-selection, and household-level self-selection.

Therefore, if the variable of concern is clearly predetermined—so that we can ignore the causal impact of treatment—we can have an idea about the household-level self-selection effect by comparing type-T and type-C_1 households. The difference between this comparison and the comparison of type-T and type-C_2 households gives us suggestive information vis-à-vis effects due to village-level selection (both endogenous placement and village-level self-selection). By comparing these comparison results with results using variables that may be endogenous to PHKN interventions, the direction of the causal impact can be inferred. This is our empirical strategy in analyzing household and individual-level data.

3.3.2 Household-level analysis

<Variables of concern>

Table 8 shows the summary statistics of household-level variables that affect the welfare of individuals in the household. First, in terms of demography, the average household contains 6.2 members; the female population therein is larger than the male population, on average (the mean of the female–male ratio is 1.14). Thus, our sample households are smaller in size than the national average (7.20) and more favorable to females (the national population female–male ratio is 0.93). About 9% of the sample households are headed by female heads. The average number of years of education among household heads is low, only 5.8 years. On average, 34% of households suffered from the 2010 floods, and the same percentage suffered damage on account of wild-boar attacks.

The main physical assets of the sample households are land and livestock. Both of them are distributed unequally across households, as shown in large standard deviations of these variables. The household-level usage ratios for natural gas, internet, and cable TV are much lower than the village-level indicator of the availability of these amenities in the village, implying a substantial within-village variation in the actual use of such services. House conditions and land ownership are safely considered exogenous to PHKN interventions, while livestock ownership and amenity use may be more endogenous. As measures of income diversification, the number of household members employed on a full-time base and the dummy for remittance receipts are shown in Table 8. About one-fifth of the sample households have access to remittance income. Parallel to the village-level analysis, we show two variables that proxy susceptibility to natural disasters.

The main welfare indicator for a household is consumption.[15] The table shows five measures of aggregate consumption: total expenditure, food expenditure, non-food expenditure, total expenditure per capita, and food expenditure per adult equivalence unit. The average of total per-capita expenditure is Rs. 230,000, that is, US$2,670 per capita per annum. As a welfare indicator capturing a different aspect, we include in the table an indicator variable regarding women's mobility. This is a measure of women's empowerment, and its higher value implies higher welfare for women, *ceteris paribus*. On average, 57% of sample households replied that women of the household are allowed to move freely within the village, of which 20.8 percentage points require no permission for movement.

<Comparison of treatment and control households >

Table 9 shows that there is no difference between type-T and C_1 or between type-T and C_2 households with respect to demographic characteristics. On the other hand, the susceptibility to natural disasters (both floods and wild boars) is higher among treatment households than among control households, and three of the four differences are statistically significant. Since we have no reason to expect natural disasters to occur in response to PHKN treatment, we interpret this finding in terms of self-selection: those households that are more vulnerable to natural disasters, even within the village, are more likely to join the CO. In this sense, the assertion that PHKN targets the environmentally vulnerable appears to hold, not only across villages but also within villages.

As far as asset and consumption indicators are concerned, there is no difference

[15] Using per-capita consumption, we also calculated poverty measures. Since the poverty line for our survey villages is not definite, we do not report the results here. However, the contrast shown in poverty measures is qualitatively the same as the contrast shown in this paper using per-capita consumption. Poverty measures also confirm that treatment households are poorer than C_2 households but not different from C_1 households.

between type-T and C_1 households. In sharp contrast, there is a statistically significant difference between type-T and C_2 households in terms of these variables, and the direction of the difference is clear: Type-T households are poorer than type-C_2 households.[16] We interpret these results as mainly reflecting village-level selection (both PHKN's placement and villages' self-selection); poorer villages are more likely to be under treatment, and the welfare-improving impact of PHKN interventions is not strong enough to mitigate the negative selection effects.

There is an interesting contrast in two variables (*zu_in* and *zu_out*), both of which are associated with the Islamic practice of charity giving. Muslims are encouraged to give a fixed portion of their wealth (called *Zakat* and *Ushr*) to charity, generally to the poor and needy. The proportion of recipients is significantly higher among type-T households than among C_2 households. This suggests that treatment households live in poorer villages that are often recipients of *Zakat*. On the other hand, the proportion of Zakat givers is significantly higher among type-T households than among type-C_1 households. This could be due to the causal effect of the PHKN intervention on the behavior of treatment households and/or to self-selection within a village (i.e., those households who have inherent attitudes in favor of charity giving are more likely to join the program).

Women's mobility (*w_emp*) is significantly higher among type-T households than in type-C_1 or C_2 households. Again, this could be due to the causal effect of the PHKN intervention on women's empowerment and/or to self-selection (i.e., those households in which women are already empowered are more likely to join the program).

To examine whether these patterns continue to hold once we control for other factors, we first run regressions using one of the household-level demographic variables, vulnerability, assets, and income shocks as the dependent variable and a selected set of these variables and two additional dummy variables for C_1 and C_2 households (the reference category type-T households) as explanatory variables. The results, which are available on request, mostly confirm the bivariate pattern. Since these household-level variables are more predetermined than consumption or empowerment variables, we then run regression models using three consumption welfare indicators (i.e., total expenditure, total expenditure per capita, and food expenditure per adult equivalence unit) and women's empowerment as dependent variables, and household-level assets, income shocks, and two dummy variables for C_1 and C_2 households as explanatory variables.

The regression results are reported in Table 10.[17] Household demographic and asset

[16] With regard to consumption variables and asset indicators except for *radio*, interpretations of Table 9 are straightforward. With regard to the variable *radio*, the table shows that type-T households use radios much more than those of type-C_2. Given the general proliferation of television and the internet, such radio use in the study area is a reflection of poverty.

[17] Since the women's mobility variable is an indicator variable—wherein a higher value corresponds to

characteristics have coefficients with the expected sign. The number of household members correlates positively with total expenditure, but negatively with per-capita (or per-adult equivalence unit) consumption; more educated households have higher consumption and higher women's empowerment; remittance-receiving households enjoy higher consumption; and flood damage reduced consumption (although the significance level was low).

Even after controlling for these factors, the contrast between the treatment and control households remain the same. Type-*T* households have significantly lower consumption and higher empowerment than type-C_2 households, while type-*T* households, in comparison to type-C_1 households, have similar consumption levels but higher empowerment. Considering the possibility that female and male COs have different characteristics, we re-estimate these regression models while excluding the portion of the type-*T* households that are associated with male COs. The results are reported in Appendix Table 4; they are very similar to those reported in Table 10. The striking difference between C_1 and C_2 households suggests that the net effect of both PHKN's endogenous placement and villages' self-selection is relatively large, in comparison to the causal impact and household selection.

3.3.3 Individual-level analysis

One drawback of using household-level welfare indicators, such as per-capita consumption, is that intra-household inequality is ignored. Using individual-level information pertaining to the 3,600 individuals comprising the sample households, we compare individual-level welfare indicators between CO households and others.

Among adults, education and market-oriented employment are used as individual-level welfare indicators. The education level of an adult is safely interpreted as exogenous to PHKN interventions. As shown in Table 11, there is no significant difference in the education level—or, if there is, adults in treatment households are better educated than those in control households. This finding suggests that once poorer and less-educated villages are selected for PHKN interventions, more-educated individuals inside the village may more actively participate in CO activities.

As shown in Table 11, adult females in treatment households tend to work more in line with market orientation. The difference is statistically significant in comparison to C_1 and C_2 households.[18] Since working status is more endogenous, which may reflect the causal impact of PHKN activities on household behavior, we interpret this as suggestive evidence of PHKN's impact on women's empowerment. However, it is also possible that this is due to selection:

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higher mobility—we also estimated an ordered-probit model with the same explanatory variables. The results (available on request) are qualitatively the same as those shown in Table 10.

[18] The difference remains statistically significant in the multiple regression results, when using explanatory variables similar to those reported in Table 12.

households with adult females who were inherently oriented towards market work tend to become CO member households. Distinguishing the two is left to future research.

Among children, we use school enrollment dummies for those aged between 6 and 15, while we use weight-for-age for those up to five years of age. Table 11 shows the comparison results, which distinguish girls from boys. Female infants in treatment households are slightly lighter than those in non-CO villages (i.e., C_2 households), and this difference is significant at the 5% level. This may suggest the possibility that female infants tend to suffer more from under-nutrition those who live in treatment households. However, since children in our sample are overweight on average, a lighter child may imply a healthier child. When we replace the weight-for-age variable with the dummy variable for underweight, there was no significant difference among the three groups. The multiple regression results also suggest that there was no significant difference in weight-for-age among girls and boys in three types of households (Table 12). This may be due to the cancelling-out of a positive causal effect and a negative selection effect, or to measurement error in weighing infants.

As shown in the middle portion of Table 11, children of primary-school age are properly enrolled in schools: the enrollment ratio is close to 100%, regardless of gender or PHKN treatment type. Looking at older children (i.e., those in middle or high school), the enrollment rate declines overall. Both girls and boys in treatment households enjoy higher enrollment ratios than children in control households; between T and C_1 households, the difference is marginally significant among boys. The significant difference was reconfirmed in the multiple regression results (Table 12); this could, once again, suggest two possibilities: owing to the causal impact of PHKN's promotion of schooling, girls (aged 11–15) in treatment households are more likely to be enrolled in schools, and/or, households that have an inherent preference for girls' education tend to become CO members. Regression results excluding the portion of the type-T households associated with male COs are qualitatively the same as those reported in Table 12 (see Appendix Table 5).

4. Summary and Conclusion

In this paper, we assess what kinds of villages and households are served by community-based development activities, in order to infer the impact of such activities on poverty reduction. For this purpose, we examine the case of a female-oriented NGO in northwestern Pakistan. We combine descriptive analyses of villages, COs (community-based organizations organized by the NGO), and household-level variables. It was revealed that the NGO was able to target poorer villages: the participating villages are characterized by lower adult literacy rates, less availability of basic amenities, and higher susceptibility to natural disasters.

With regard to household welfare indicators, we compare consumption, women's empowerment, children's school enrolment, and the weight-for-age of infants, between treatment households and control households. Using consumption measures, we find that CO member households tend to be poorer than households in non-CO villages, but that the difference between CO member households and non-member households in CO villages is insignificant. This is possibly due to a mixing of the selection effect (i.e., poorer households are served by the NGO) and the causal effect of interventions on poverty reduction. Using women's empowerment and child enrollment measures, we find that households treated by the NGO's interventions are associated with higher empowerment and higher enrollment. Based on field observations, the contrast appears to be evidence for the causal impact of interventions on poverty reduction. However, we cannot deny the possibility that this could reflect self-selection by treatment households vis-à-vis program participation. We are unable to find any difference in infant weight in terms of age, possibly owing to measurement error.

Overall, our assessment of the NGO's interventions is that they are well targeted towards the poor and are affecting change with regard to poverty reduction and women's empowerment. It is left to further study to rigorously identify several routes of selection effects and the causal impact of interventions. Another direction of research would be an in-depth investigation of CO formation and changes in the local governance structure as induced by COs. Through such investigations—which are left to future research—we could identify factors that lead to sound targeting by the NGO.

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Table 1. Summary statistics of village-level variables

Description	Variable	Mean	Std. Dev.	Min	Max
Classification of villages					
Haripur District	d_haripur	0.943	dummy	0	1
Abbotabad District	d_abbotabad	0.038	dummy	0	1
Mansehra District	d_mansehra	0.019	dummy	0	1
CO village (default definition)	d_co1	0.381	dummy	0	1
CO village (narrower definition)	d_co2	0.229	dummy	0	1
CO village (wider definition)	d_co3	0.571	dummy	0	1
Demography					
Adult literacy rate (%age)	lit_rate	54.33	18.96	5	95
Population	vil_pop	2474.95	1812.49	140	8245
Profession (%age of total population): agriculture	agri_prof_~c	53.29	22.49	0	92
Profession (%age of total population): services	services	20.09	15.51	0	80
Profession (%age of total population): self	self_emp	7.79	8.40	0	50
Profession (%age of total pop.): non-farm labor	lab_nform	12.92	11.93	0	90
Profession (%age of total population): others	other_prof	5.91	7.11	0	40
Basic amenities, infrastructure, and shops					
Connection to canal irrigation	irrigated_~e	0.276	dummy	0	1
Length of the road connecting the village with a major market (km)	rd_length	14.98	12.44	1	50
Clean drinking water availability (%age of total village population)	cln_drnk_wat	74.56	31.56	0	100
Availability of gas connection in the village	gas	0.210	dummy	0	1
Availability of cable TV connection	c_tv	0.267	dummy	0	1
Availability of internet connection	i_net	0.257	dummy	0	1
Karyana shop (grocery shop)	kar_shop	0.819	dummy	0	1
Vegetable shop	veg_shop	0.543	dummy	0	1
Fruit shop	frt_shop	0.390	dummy	0	1
Existence of medical facilities in the village					
Basic Health Unit (Govt)	bhu	0.162	dummy	0	1
Rural Health Center (Govt)	rhu	0.048	dummy	0	1
Doctor's presence in BHU or RHC	dr_bhu_rhu	0.181	dummy	0	1
Traditional birth attendant	tba	0.714	dummy	0	1
Existence of education institutions in the					
Primary school (1st to 5th grades)	prim_school	0.867	dummy	0	1
Middle school (6th to 8th grades)	mid_sch	0.352	dummy	0	1
High school (9th to 10th grades)	hi_scho	0.219	dummy	0	1
Community based school	cbsch	0.152	dummy	0	1
Deni Madrassah - DM (Religious School)	d_madra	0.457	dummy	0	1
Dispute settlement forums (DSF)					
Jirga (traditional DSF)	jirga	0.800	dummy	0	1
Non-traditional DSF	dsf	0.829	dummy	0	1
Locally elected representative is from the village	ler	0.705	dummy	0	1
Susceptibility to natural disasters					
Village suffered flood damages in July-Aug	fld_dmg	0.876	dummy	0	1

Note: The number of observations is 105.
Source: Calculated by the author from the PKHS database (same for the following tables).

Table 2. Comparison of CO villages and non-CO villages

Variable	Mean for each group			Difference (A)-(B)		Difference (A)-(C)	
	(A) CO villages (n =40)	(B) Non-CO villages, all (n =65)	(C) Non-CO villages, Haripur (n =59)	Mean	(S.E.)	Mean	(S.E.)
Demography							
lit_rate	49.13	57.54	57.03	-8.41 **	(3.86)	-7.91 **	(3.90)
vil_pop	2252.05	2612.12	2475.22	-360.07	(369.11)	-223.17	(372.95)
agri_prof_~c	55.28	52.06	55.66	3.21	(4.36)	-0.39	(4.22)
services	16.80	22.11	21.31	-5.31 *	(2.97)	-4.51	(2.96)
self_emp	5.60	9.14	6.93	-3.54 **	(1.47)	-1.33	(1.08)
lab_nform	15.10	11.58	11.58	3.52	(2.29)	3.52	(2.37)
other_prof	7.23	5.11	4.53	2.12	(1.65)	2.70	(1.63)
Basic amenities, infrastructure, and shops							
irrigated_~e	0.250	0.292	0.322	-0.042	(0.090)	-0.072	(0.093)
rd_length	14.13	15.51	16.75	-1.38	(2.22)	-2.62	(2.31)
cln_drnk_wat	71.38	76.52	76.17	-5.15	(6.64)	-4.79	(6.73)
gas	0.025	0.323	0.254	-0.298 ***	(0.064)	-0.229 ***	(0.062)
c_tv	0.175	0.323	0.288	-0.148 *	(0.084)	-0.113	(0.085)
i_net	0.100	0.354	0.339	-0.254 ***	(0.077)	-0.239 ***	(0.079)
kar_shop	0.725	0.877	0.864	-0.152 *	(0.082)	-0.139	(0.084)
veg_shop	0.625	0.492	0.458	0.133	(0.100)	0.167	(0.101)
frt_shop	0.325	0.431	0.390	-0.106	(0.097)	-0.065	(0.099)
Existence of medical facilities in the village							
bhu	0.125	0.185	0.186	-0.060	(0.072)	-0.061	(0.074)
rhu	0.025	0.062	0.051	-0.037	(0.039)	-0.026	(0.038)
dr_bhu_rhu	0.125	0.215	0.220	-0.090	(0.074)	-0.095	(0.076)
tba	0.825	0.646	0.644	0.179 **	(0.085)	0.181 **	(0.087)
Existence of education institutions in the village							
prim_school	0.850	0.877	0.881	-0.027	(0.070)	-0.031	(0.071)
mid_sch	0.325	0.369	0.339	-0.044	(0.096)	-0.014	(0.097)
hi_scho	0.250	0.200	0.186	0.050	(0.085)	0.064	(0.086)
cbsch	0.250	0.092	0.102	0.158 **	(0.078)	0.148 *	(0.080)
d_madra	0.475	0.446	0.407	0.029	(0.101)	0.068	(0.103)
Dispute settlement forums (DSF)							
jirga	0.850	0.769	0.780	0.081	(0.078)	0.070	(0.079)
dsf	0.925	0.769	0.780	0.156 **	(0.067)	0.145 **	(0.069)
ler	0.650	0.738	0.712	-0.088	(0.094)	-0.062	(0.097)
Susceptiblity to natural disasters							
fld_dmg	0.975	0.815	0.814	0.160 ***	(0.055)	0.161 ***	(0.057)

Notes: 1. The standard errors are reported in parenthesis, estimated under the asssumption that allow unequal variance of two groups. 2. The definition of a CO village is the default definition (listed as having a CO or similar activities in the PHKN village list). 3. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3. Correlates of program participation (village-level multiple regression results)

	Depedent variable: d_co1				
	Model 1	Model 2	Model 3	Model 4	Model 5
Demography					
lit_rate	-0.0017	-0.0003	-0.0010	-0.0016	0.0000
	[0.0035]	[0.0035]	[0.0035]	[0.0031]	[0.0031]
vil_pop/1000	-0.0065	0.0000	-0.0034	0.0076	0.0121
	[0.0381]	[0.0371]	[0.0338]	[0.0370]	[0.0325]
agri_prof_prc	-0.0023	-0.0026	-0.0035	-0.0023	-0.0036
	[0.0026]	[0.0025]	[0.0027]	[0.0024]	[0.0025]
Basic amenities, infrastructure, and shops					
irrigated_village	-0.0380	-0.0405	-0.0698	-0.0930	-0.1132
	[0.1386]	[0.1372]	[0.1354]	[0.1385]	[0.1330]
rd_length	-0.0135***	-0.0140***	-0.0126***	-0.0121***	-0.0119***
	[0.0043]	[0.0041]	[0.0044]	[0.0045]	[0.0044]
cln_drnk_wat	-0.0002	-0.0003	-0.0005	-0.0010	-0.0013
	[0.0019]	[0.0018]	[0.0018]	[0.0017]	[0.0017]
gas	-0.3630*	-0.3680**	-0.4254**	-0.3433*	-0.4076**
	[0.1992]	[0.1847]	[0.1953]	[0.1825]	[0.1793]
i_net	-0.2144	-0.2104	-0.1945	-0.2345	-0.2098
	[0.1845]	[0.1690]	[0.1730]	[0.1746]	[0.1633]
kar_shop	-0.1575	-0.1550	-0.1483	-0.1895	-0.1733
	[0.1516]	[0.1579]	[0.1474]	[0.1349]	[0.1402]
Access to education and medical facilities					
prim_school	-0.0479	-0.0298	-0.0498	-0.0585	-0.0461
	[0.1440]	[0.1454]	[0.1440]	[0.1368]	[0.1391]
mid_sch	-0.0633	-0.0635	-0.0668	-0.0992	-0.0957
	[0.1129]	[0.1115]	[0.1106]	[0.1148]	[0.1118]
hi_scho	0.0990	0.0627	0.0830	0.0007	-0.0194
	[0.1545]	[0.1580]	[0.1532]	[0.1550]	[0.1556]
d_madra	0.1413	0.1481	0.0934	0.1464	0.1062
	[0.1168]	[0.1169]	[0.1110]	[0.1170]	[0.1126]
bhu	0.1013	0.0421	0.0734	0.0959	0.0316
	[0.1669]	[0.1676]	[0.1672]	[0.1603]	[0.1583]
Susceptiblity to natural disasters					
dis_prone_vil	0.2290	0.2580	0.1967	0.2652*	0.2481*
	[0.1555]	[0.1562]	[0.1537]	[0.1525]	[0.1489]
Potentially endogenous variables					
dsf		0.2450**			0.1649
		[0.1192]			[0.1318]
cbsch			0.3007**		0.2757**
			[0.1342]		[0.1229]
tba				0.3076***	0.2482**
				[0.0972]	[0.1035]
R-squared	0.288	0.317	0.327	0.347	0.392
F-statistics	5.922	4.363	6.795	5.502	8.208
Level of Significance	0.000	0.000	0.000	0.000	0.000

Notes: 1. In addition to those explanatory variables listed above, intercept, Mansehra dummy, and Abbotabad dummy are also included. 2. Estimated by OLS (linear probability model), with robust standard errors (reported in brackets). 3. The number of observations is 105. 4. * p<0.1, ** p<0.05, *** p<0.01

Table 4. Summary statistics of CO-level variables

Description	Variable	Mean	Std. Dev.	Min	Max
CO characteristics fixed at the time of formation					
Number of CO members	mem_no	23.44	5.08	16	40
Dummy for a male CO	co_type	0.256	dummy	0	1
Incubation period in days (time from the first PHKN contact to the CO formation)	incub_per	50.14	54.08	1	398
Age of the CO in months (time from the CO formation to the survey date)	co_age	44.93	39.45	0	163
President's age (years)	age_presi	39.34	10.34	22	75
President's education (years)	edu_presi	5.31	5.21	0	14
Secretary's age (years)	age_sec	34.16	10.26	20	63
Secretary's education (years)	edu_sec	7.53	5.10	0	14
Activist's age (years)	acti_age	36.10	12.80	18	70
Activist's education (years)	acti_edu	6.08	5.40	0	16
PHKN activities after the CO formation					
Total of savings by CO members (Rs.)	saving	7869.33	4262.23	500	20000
Average savings per member (Rs.)	saving_pc	357.77	221.78	20	1111
Dummy for microfinance lending activity	mf	0.267	dummy	0	1
Dummy for micro-infrastructure project (MIP)	mip	0.356	dummy	0	1
Number of MIPs completed	comp_mips_no	0.400	0.632	0	3
Leadership and managerial skill development trainings	lmst	0.244	dummy	0	1
Non-conventional human resource development trainings	nct	0.544	dummy	0	1
Natural disaster management trainings	ndm_nct	0.233	dummy	0	1

Note: The number of observations is 90.

Table 5. Comparison of female COs and male COs

Variable	Mean for each group (A) Female COs (n=67)	(B) Male COs (n=23)	Difference (A)-(B) Mean		(S.E.)
CO characteristics fixed at the time of formation					
mem_no	22.91	25.00	-2.09	**	(1.01)
incub_per	50.72	48.48	2.24		(11.66)
co_age	53.49	20.00	33.49	***	(6.88)
age_presi	38.51	41.78	-3.28		(2.26)
edu_presi	3.85	9.57	-5.71	***	(0.99)
age_sec	32.31	39.52	-7.21	**	(3.05)
edu_sec	6.67	10.04	-3.37	***	(1.02)
acti_age	35.36	38.26	-2.90		(3.48)
acti_edu	5.15	8.78	-3.63	***	(1.25)
PHKN activities after the CO formation					
saving	8189.60	6936.39	1253.21		(1126.76)
saving_pc	380.65	291.12	89.53		(54.15)
mf	0.358	0.000	0.358	***	(0.059)
mip	0.418	0.174	0.244	**	(0.101)
comp_mips_no	0.493	0.130	0.362	***	(0.110)
lmst	0.224	0.304	-0.080		(0.111)
nct	0.687	0.130	0.556	***	(0.092)
ndm_nct	0.284	0.087	0.197	**	(0.082)

Notes: 1. The standard errors are reported in parenthesis, estimated under the asssumption that allow unequal variance of two groups. 2. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6. Correlates of CO performance (CO-level multiple regression results)

	Depedent variable:					
	saving_pc		mf		mip	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Village-level variables						
lit_rate	0.4275	2.0116	0.0032	0.0041	0.0099**	0.0093***
	[1.6263]	[1.7977]	[0.0036]	[0.0034]	[0.0038]	[0.0034]
vil_pop/1000	-5.8312	-5.3699	0.0468	0.0322	-0.0316	-0.032
	[17.3736]	[19.6712]	[0.0429]	[0.0385]	[0.0433]	[0.0397]
agri_prof_prc	1.7682	1.3408	0.0069***	0.0069***	0.0036	0.002
	[1.2905]	[1.2048]	[0.0023]	[0.0024]	[0.0026]	[0.0021]
rd_length	-3.7257	-4.964	-0.0017	-0.0004	-0.0202**	-0.0053
	[4.7531]	[4.8117]	[0.0074]	[0.0074]	[0.0083]	[0.0077]
cln_drnk_wat	2.4710***	1.2044	0.001	-0.0005	0.0029**	-0.0017
	[0.6610]	[0.7912]	[0.0013]	[0.0016]	[0.0013]	[0.0013]
CO characteristics fixed at the time of formation						
mem_no		-13.7546***		-0.0102		-0.0150*
		[4.4261]		[0.0096]		[0.0087]
co_type		-108.593		-0.3879***		0.1307
		[77.8009]		[0.1018]		[0.1319]
incub_per		0.5790**		0.0001		0.0004
		[0.2465]		[0.0006]		[0.0006]
co_age		-0.3506		0.0013		0.0067***
		[0.7931]		[0.0014]		[0.0011]
age_leader$		10.4605***		0.0164***		-0.001
		[3.1007]		[0.0055]		[0.0049]
edu_leader$		9.8571		0.0237*		-0.0158
		[6.4012]		[0.0123]		[0.0125]
acti_age		-0.0431		0.0006		-0.0023
		[1.8313]		[0.0037]		[0.0035]
acti_edu		-0.9549		0.0045		-0.0166*
		[5.6769]		[0.0092]		[0.0092]
Intercept	102.0245	71.3986	-0.4978**	-0.9124*	-0.1619	0.4427
	[121.1415]	[204.8103]	[0.1953]	[0.5048]	[0.2382]	[0.3952]
R-squared	0.200	0.407	0.260	0.413	0.244	0.521
F-statistics	7.852	6.891	7.292	6.126	8.391	26.102
Level of Significance	0.000	0.000	0.000	0.000	0.000	0.000

Notes: 1. The number of observations is 90, all of which are in District Haripur. 2. Estimated by OLS (i.e., linear probability model when the dependent variable is mf or mip), with robust standard errors reported in brackets. 3. * p <0.1, ** p <0.05, *** p <0.01

$ "age_leader" is the average of the age of president and that of secretary while "edu_leader" is the average of the education years of president and that of secretary.

Table 7. Correlation among CO performance indicators

	Based on observed values			Based on regression residuals		
	saving_pc	mf	mip	saving_pc	mf	mip
Bivariate correlation coefficients						
saving_pc	1			1		
mf	0.4773***	1		0.2546**	1	
mip	0.3815***	0.3394***	1	0.1967*	0.0659	1
Bivariate regression coefficient						
saving_pc /100		0.0957***	0.0828***		0.0508**	0.0384*
		[0.0188]	[0.0229]		[0.0206]	[0.0230]
R-squared		0.228	0.146		0.065	0.039
F-statistics		25.833	13.076		6.109	2.773
Level of Significance		0.000	0.001		0.015	0.099

Notes: 1. The number of observations is 90, all of which are in District Haripur. 2. The regression model is a linear probability model estimated by OLS with only the intercept and the per-capita saving in Rs.100 are used as explanatory variables, with robust standard errors in brackets. 3. * p <0.1, ** p <0.05, *** p <0.01.

Table 8. Summary statistics of household-level variables

Description	Variable	Mean	Std. Dev.	Min	Max
Demography					
Number of household members	hhsize	6.17	2.69	1	16
Ratio of female members over male members	fem_rate	1.14	0.87	0	5
Dummy for a female-headed household	fem_hh	0.086	dummy	0	1
Years of education of the household head	hh_edu	5.92	4.37	0	16
Literacy status of the household head	hh_lite	0.732	dummy	0	1
Age of the household head	hh_age	49.72	13.99	20	90
Susceptibility to natural disasters					
The household was affected by 2010 floods	fldaffecte~h	0.343	dummy	0	1
The household suffered damages due to attacks by wild boars	wildboar_a~k	0.338	dummy	0	1
Household asset indicators					
The flooring of the house is paved or not	h_floor	0.123	dummy	0	1
The house has drainage	drainge	0.429	dummy	0	1
The house is connected with gas for cooking	gas	0.081	dummy	0	1
Value of land owned by the hh (Rs.1,000,000)	land_val	0.579	1.492	0	25.000
Value of livestock owned by the hh (Rs.1,000,000)	livestock_~l	0.034	0.067	0	0.857
The household has and uses a radio	radio	0.300	dummy	0	1
The household uses internet	internet	0.005	dummy	0	1
The house is connected with cable TV	cab_tv	0.014	dummy	0	1
Household income inflow and outflow					
No of hh members employed on the full time base	fulltime_e~o	1.468	0.875	0	5
Remittance recipient status	remittance	0.197	dummy	0	1
Zakat/Ushr recipient status	zu_in	0.033	dummy	0	1
Zakat/Ushr payer status	zu_out	0.106	dummy	0	1
Household annual consumption expenditure including the imputed value of in-kind transactions					
Total non-food expenditure (Rs.1,000)	exp_nonfd	67.920	65.954	3	763
Total food expenditure (Rs.1,000)	exp_food	164.510	76.86	21	649
Total expenditure (Rs.1,000)	tot_exp	232.430	128.05	28	1357
Total expenditure per capita (Rs.1,000)	exp_pc	39.987	17.11	12	143
Total food expenditure per adult equivalence units* (Rs.1,000)	food_pae	37.062	13.94	11	110
Women's mobility					
Indicator taking the value of 3 if women of the household are allowed to move freely within the village without permission, 2 if they are allowed to move within the village but permission required, and 1 otherwise	w_emp	mean	w_emp=1	w_emp=2	w_emp=3
		1.777	43.1%	36.2%	20.8%

Note: The number of observations is 583.
* The adult equivalne units we used are: 0.25 for infants (age<=5), 0.5 for children (age>5 & age<=14), 0.8 for teenagers (age>14 & age<=18), 0.9 for female adults (age>18 & age<=60), 1.0 for male adults (age>18 & age<=60), and 0.8 for the elderly (age>60).

Table 9. Comparison of household characteristics by PHKN treatment status

	Mean for each group			Difference (T)-(C_1)		Difference (T)-(C_2)	
Variable	(T) CO member household (n=249)	(C_1) Non-member household in CO villages (n=234)	(C_2) Household in non-CO villages (n=100)	Mean	(S.E.)	Mean	(S.E.)
Demography							
hhsize	6.18	6.02	6.51	0.16	(0.24)	-0.33	(0.34)
fem_rate	1.15	1.11	1.20	0.04	(0.08)	-0.05	(0.11)
fem_hh	0.080	0.107	0.050	-0.027	(0.027)	0.030	(0.028)
hh_edu	6.21	5.57	6.00	0.64	(0.40)	0.21	(0.52)
hh_lite	0.763	0.709	0.710	0.054	(0.040)	0.053	(0.053)
hh_age	49.30	50.06	49.98	-0.77	(1.29)	-0.68	(1.62)
Susceptibility to natural disasters							
fldaffecte~h	0.390	0.274	0.390	0.116 ***	(0.043)	0.000	(0.058)
wildboar_a~k	0.402	0.299	0.270	0.102 **	(0.043)	0.132 **	(0.054)
Household asset indicators							
h_floor	0.120	0.090	0.210	0.031	(0.028)	-0.090 *	(0.046)
drainge	0.394	0.368	0.660	0.026	(0.044)	-0.266 ***	(0.057)
gas	0.000	0.004	0.460	-0.004	(0.004)	-0.460 ***	(0.050)
land_val	0.503	0.429	1.117	0.074	(0.086)	-0.614 **	(0.296)
livestock_~l	0.034	0.036	0.031	-0.001	(0.006)	0.004	(0.007)
radio	0.329	0.321	0.180	0.009	(0.043)	0.149 ***	(0.049)
internet	0.000	0.000	0.030	0.000	(0.000)	-0.030 *	(0.017)
cab_tv	0.008	0.000	0.060	0.008	(0.006)	-0.052 **	(0.025)
Household income inflow and outflow							
fulltime_e~o	1.438	1.474	1.530	-0.037	(0.080)	-0.092	(0.104)
remittance	0.213	0.175	0.210	0.038	(0.036)	0.003	(0.048)
zu_in	0.032	0.047	0.000	-0.015	(0.018)	0.032 ***	(0.011)
zu_out	0.129	0.064	0.150	0.064 **	(0.027)	-0.021	(0.042)
Household annual consumption expenditure including the imputed value of in-kind transactions							
exp_nonfd	66.11	59.56	91.99	6.55	(5.23)	-25.88 **	(10.07)
exp_food	158.94	156.60	196.88	2.33	(6.66)	-37.94 ***	(9.76)
tot_exp	225.05	216.16	288.87	8.88	(10.77)	-63.82 ***	(17.29)
exp_pc	39.09	37.94	46.99	1.15	(1.47)	-7.90 ***	(2.24)
food_pae	36.27	35.93	41.69	0.34	(1.23)	-5.43 ***	(1.76)
Women's mobility							
w_emp	1.976	1.611	1.670	0.365 ***	(0.067)	0.306 ***	(0.093)

Notes: 1. The standard errors are reported in parenthesis, estimated under the asssumption that allow unequal variance of two groups. 2. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 10. Correlates of household consumption (household-level multiple regression results)

	Depedent variable:			
	tot_exp	exp_pc	food_pae	w_emp
Household demographic and asset characteristics				
hhsize	22.7355***	-2.9344***	-1.7487***	-0.0065
	[1.7794]	[0.3368]	[0.2509]	[0.0136]
fem_hh	-19.1609*	0.3929	0.9666	0.0802
	[9.9353]	[2.0832]	[1.9053]	[0.1053]
hh_edu	3.4119***	0.6019***	0.4563***	0.0223***
	[1.1835]	[0.1654]	[0.1421]	[0.0074]
hh_age	0.7351**	0.1292**	-0.0164	-0.0004
	[0.3134]	[0.0498]	[0.0375]	[0.0035]
h_floor	36.9816*	4.0046	3.9557**	-0.1581*
	[19.6135]	[2.7523]	[1.9076]	[0.0874]
drainge	8.915	1.0248	-0.0426	0.0576
	[10.8062]	[1.5358]	[1.0818]	[0.0705]
land_val	1.6037	0.3128	-0.1558	-0.0027
	[5.4036]	[0.7265]	[0.4238]	[0.0289]
livestock_val	267.8397	26.7596	19.9533*	0.4311
	[197.9322]	[19.0811]	[11.5494]	[0.6506]
fulltime_ehhm_no	10.4277**	1.1999*	-1.7794***	-0.0296
	[4.3890]	[0.6959]	[0.6534]	[0.0322]
remittance	46.4063***	7.2340***	4.9927***	0.0519
	[11.5239]	[1.8594]	[1.4802]	[0.0804]
fldaffected_hh	-12.7057	-2.8444*	-1.4116	0.0409
	[8.8682]	[1.4996]	[1.0730]	[0.0612]
Without PHKN treatment				
dummy for C_1	-2.022	-1.3197	-0.1751	-0.3497***
	[5.3752]	[1.1173]	[0.9566]	[0.0419]
dummy for C_2	49.5255**	8.0855***	6.1352***	-0.2915***
	[18.7046]	[2.9087]	[2.1252]	[0.1078]
Intercept	-9.3223	42.9849***	45.9611***	1.8910***
	[24.1740]	[4.5991]	[3.7852]	[0.2188]
R-squared	0.522	0.246	0.213	0.073
F-statistics	33.003	40.582	14.323	16.682
Level of Significance	0.000	0.000	0.000	0.000

Notes: 1. The number of observations is 583, all of which are in District Haripur. 2. Estimated by OLS, with robust standard errors clustered at the village level reported in brackets. 3. * $p<0.1$, ** $p<0.05$, *** $p<0.01$

Table 11. Comparison of individual welfare indicators by PHKN treatment status

	Mean for each group			Difference (T)-(C_1)		Difference (T)-(C_2)	
	(T) Individuals belonging to a CO member household	(C_1) Individuals belonging to a non-member household in CO	(C_2) Individuals belonging to a household in non-CO villages	Mean	(S.E.)	Mean	(S.E.)
Adult females (age>19)							
number of obs.	422	393	172				
d_lit	0.591	0.618	0.494	-0.027	(0.034)	0.097 **	(0.112)
educ_yrs	4.02	4.17	4.48	-0.15	(0.30)	-0.46	(0.03)
d_work	0.054	0.028	0.029	0.026 *	(0.014)	0.025 **	(0.523)
Adult males (age>19)							
number of obs.	453	415	204				
d_lit	0.872	0.851	0.863	0.021	(0.024)	0.009	(0.029)
educ_yrs	7.75	7.26	8.27	0.50 *	(0.27)	-0.51	(0.34)
d_work	0.675	0.725	0.686	-0.050	(0.031)	-0.011	(0.039)
Girls (age=0-5)							
number of obs.	41	44	21				
wgt_ratio	1.151	1.144	1.231	0.007	(0.051)	-0.079 **	(0.045)
Boys (age=0-5)							
number of obs.	42	40	32				
wgt_ratio	1.154	1.104	1.129	0.050	(0.043)	0.025	(0.039)
Girls (age=6-10)							
number of obs.	108	82	37				
d_enrol	0.991	0.988	1.000	0.003	(0.015)	-0.009	(0.009)
Boys (age=6-10)							
number of obs.	110	104	27				
d_enrol	1.000	1.000	1.000	0.000	(0.000)	0.000	(0.000)
Girls (age=11-15)							
number of obs.	84	77	39				
d_enrol	0.917	0.766	0.846	0.150	(0.057)	0.071	(0.066)
Boys (age11-15)							
number of obs.	90	85	28				
d_enrol	0.989	0.965	0.929	0.024 *	(0.023)	0.060	(0.051)

Notes: 1. The standard errors are reported in parenthesis, estimated under the assumption that allow unequal variance of two groups. 2. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Welfare indicators (in italics) are as follows: *d_lit* = literacy dummy, *educ_yrs* = completed years of education, *d_work* = dummy for market-oriented work (including unpaid work for self-employment business and farming but excluding household domestic chores), *wgt_ratio* = the child's weight divided by the WHO standard weight for the same age (calculated in months), *d_enrol* = dummy for the current enrollment in school.

Table 12. Correlates of human capital investment in children (individual-level regression results)

	Dep.var = *wgt_ratio* (weight-for age), children aged 0-5		Dep.var = *d_enrol* (school enrollment), children aged 11-15	
	Girls	Boys	Girls	Boys
Household demographic and asset characteristics				
hhsize	0.0053	0.0125	0.0137	0.0125
	[0.0179]	[0.0084]	[0.0126]	[0.0074]
fem_hh	-0.0104	-0.114	0.0803	-0.0535
	[0.0884]	[0.1144]	[0.1006]	[0.0921]
hh_edu	0.0027	-0.0027	0.0100*	0.0004
	[0.0067]	[0.0073]	[0.0051]	[0.0033]
hh_age	0.0008	-0.0027	-0.0069***	-0.0008
	[0.0022]	[0.0026]	[0.0022]	[0.0019]
h_floor	0.0117	0.0377	0.0845	0.0381*
	[0.0549]	[0.0496]	[0.0714]	[0.0191]
drainge	0.0612*	0.045	0.0238	-0.0031
	[0.0341]	[0.0477]	[0.0601]	[0.0260]
land_val	-0.0132	-0.0156	-0.0218	0.0085*
	[0.0269]	[0.0187]	[0.0200]	[0.0048]
livestock_val	-0.2062	-0.1995	0.6976	-0.2093
	[0.8695]	[0.2665]	[0.5075]	[0.1606]
fulltime_ehhm_no	-0.0284	0.0064	-0.0142	-0.0275
	[0.0376]	[0.0212]	[0.0446]	[0.0211]
remittance	0.0091	-0.0184	0.0144	0.0419**
	[0.0863]	[0.0501]	[0.0863]	[0.0201]
fldaffected_hh	0.0826	0.0281	0.1212**	0.0048
	[0.0579]	[0.0454]	[0.0477]	[0.0276]
No PHKN treatment				
dummy for C_1	0.0095	-0.0237	-0.1157*	-0.0125
	[0.0692]	[0.0396]	[0.0591]	[0.0215]
dummy for C_2	0.0645	-0.0322	-0.0407	-0.062
	[0.0715]	[0.0456]	[0.0673]	[0.0476]
Age controls	Polynomials upto the 5th, age in months		Full set of age (in years) dummies	
R-squared	0.098	0.233	0.217	0.072
F-statistics	5.766	4.383	6.091	1.758
Level of Significance	0.000	0.000	0.000	0.078
Number of observations	106	114	200	203

Notes: 1. Estimated by OLS (i.e., linear probability model when the dependent variable is *d_enrol*), with robust standard errors clustered at the village level (reported in brackets). 2. * p <0.1, ** p <0.05, *** p <0.01.

Appendix Table 1. Comparison of CO villages and non-CO villages under different definitions of a "CO village"

	Narrower definition of CO villages				Wider definition of CO villages			
	Difference: (A: CO villages)-(B: Non-CO, all)		Difference: (A: CO villages)-(B: Non-CO, Haripur)		Difference: (A: CO villages, all)-(B: Non-CO, all)		Difference: (A': CO villages, Haripur)-(B: Non-CO, Haripur)	
Variable	Mean	(S.E.)	Mean	(S.E.)	Mean	(S.E.)	Mean	(S.E.)
Demography								
lit_rate	-12.37 ***	(3.92)	-11.94 ***	(3.96)	-12.37 ***	(3.92)	-7.91 **	(3.90)
vil_pop	-484.00	(418.59)	-374.18	(421.06)	-484.00	(418.59)	-223.17	(372.95)
agri_prof_~c	-2.64	(4.83)	-5.62	(4.73)	-2.64	(4.83)	-0.39	(4.22)
services	-5.67 *	(3.24)	-4.99	(3.23)	-5.67 *	(3.24)	-4.51	(2.96)
self_emp	-3.19 **	(1.30)	-1.40	(1.03)	-3.19 **	(1.30)	-1.33	(1.08)
lab_nform	6.15 **	(2.78)	6.16 **	(2.82)	6.15 **	(2.78)	3.52	(2.37)
other_prof	5.35 **	(2.42)	5.84 **	(2.41)	5.35 **	(2.42)	2.70	(1.63)
Basic amenities, infrastructure, and shops								
irrigated_~e	-0.088	(0.099)	-0.112	(0.101)	-0.088	(0.099)	-0.072	(0.093)
rd_length	3.54	(2.16)	2.67	(2.22)	3.54	(2.16)	-2.62	(2.31)
cln_drnk_wat	-11.58	(8.03)	-11.36	(8.08)	-11.58	(8.03)	-4.79	(6.73)
gas	-0.272 ***	(0.050)	-0.213 ***	(0.048)	-0.272 ***	(0.050)	-0.229 ***	(0.062)
c_tv	-0.292 ***	(0.067)	-0.265 ***	(0.068)	-0.292 ***	(0.067)	-0.113	(0.085)
i_net	-0.333 ***	(0.053)	-0.320 ***	(0.054)	-0.333 ***	(0.053)	-0.239 ***	(0.079)
kar_shop	-0.198 *	(0.105)	-0.187 *	(0.107)	-0.198 *	(0.105)	-0.139	(0.084)
veg_shop	0.160	(0.113)	0.187	(0.114)	0.160	(0.113)	0.167	(0.101)
frt_shop	-0.182 *	(0.106)	-0.150	(0.107)	-0.182 *	(0.106)	-0.065	(0.099)
Existence of medical facilities in the village								
bhu	0.006	(0.088)	0.007	(0.089)	0.006	(0.088)	-0.061	(0.074)
rhu	-0.008	(0.048)	0.002	(0.047)	-0.008	(0.048)	-0.026	(0.038)
dr_bhu_rhu	-0.073	(0.082)	-0.075	(0.083)	-0.073	(0.082)	-0.095	(0.076)
tba	0.262 ***	(0.078)	0.263 ***	(0.080)	0.262 ***	(0.078)	0.181 **	(0.087)
Existence of education institutions in the village								
prim_school	0.011	(0.079)	0.008	(0.079)	0.011	(0.079)	-0.031	(0.071)
mid_sch	0.029	(0.114)	0.055	(0.115)	0.029	(0.114)	-0.014	(0.097)
hi_scho	0.148	(0.107)	0.160	(0.108)	0.148	(0.107)	0.064	(0.086)
cbsch	0.073	(0.093)	0.062	(0.094)	0.073	(0.093)	0.148 *	(0.080)
d_madra	-0.106	(0.115)	-0.078	(0.116)	-0.106	(0.115)	0.068	(0.103)
Dispute settlement forums (DSF)								
jirga	0.043	(0.090)	0.033	(0.091)	0.043	(0.090)	0.070	(0.079)
dsf	0.168 **	(0.062)	0.158 **	(0.062)	0.168 **	(0.062)	0.145 **	(0.069)
ler	-0.103	(0.113)	-0.082	(0.114)	-0.103	(0.113)	-0.062	(0.097)
Susceptiblity to natural disasters								
fld_dmg	0.160 ***	(0.044)	0.160 ***	(0.043)	0.211 ***	(0.069)	0.209 ***	(0.072)

Notes: 1. The standard errors are reported in parenthesis, estimated under the asssumption that allow unequal variance of two groups. 2. The narrower definition of a CO village is that the village has currently registered COs; the wider definition of a CO village is those villages listed as having a CO or similar activities in the PHKN village list or those villages that had initial contact with PHKN but villagers failed to form a CO. The number of observation under the narrower definition is A=24, B=81, C=75, while that under the wider definition is A=60, B=45, A'=58, C=41. 4. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Appendix Table 2. Correlates of program participation (narrower definition of a CO village)

	Depedent variable: d_co2				
	Model 1	Model 2	Model 3	Model 4	Model 5
Demography					
lit_rate	-0.0033	-0.0026	-0.0029	-0.0032	-0.0028
	[0.0031]	[0.0031]	[0.0031]	[0.0026]	[0.0027]
vil_pop/1000	-0.0187	-0.0156	-0.0172	-0.0031	-0.0021
	[0.0367]	[0.0365]	[0.0368]	[0.0341]	[0.0344]
agri_prof_prc	-0.0037	-0.0039	-0.0043*	-0.0038	-0.0042*
	[0.0026]	[0.0025]	[0.0026]	[0.0023]	[0.0023]
Basic amenities, infrastructure, and shops					
irrigated_village	-0.0042	-0.0054	-0.0196	-0.0652	-0.0755
	[0.1088]	[0.1114]	[0.1149]	[0.1082]	[0.1132]
rd_length	-0.0049	-0.0051	-0.0045	-0.0033	-0.0031
	[0.0036]	[0.0037]	[0.0037]	[0.0035]	[0.0036]
cln_drnk_wat	-0.0012	-0.0012	-0.0013	-0.0021	-0.0022
	[0.0018]	[0.0018]	[0.0017]	[0.0016]	[0.0016]
gas	-0.0753	-0.0777	-0.1055	-0.0535	-0.0779
	[0.1140]	[0.1165]	[0.1201]	[0.1329]	[0.1405]
i_net	-0.2492**	-0.2473**	-0.2396**	-0.2715**	-0.2632**
	[0.1007]	[0.1023]	[0.1036]	[0.1235]	[0.1286]
kar_shop	-0.1419	-0.1408	-0.1375	-0.1775	-0.1728
	[0.1307]	[0.1295]	[0.1315]	[0.1161]	[0.1180]
Access to education and medical facilities					
prim_school	0.0892	0.0977	0.0883	0.0774	0.0778
	[0.1206]	[0.1231]	[0.1202]	[0.1164]	[0.1172]
mid_sch	-0.0394	-0.0396	-0.0411	-0.0793	-0.0795
	[0.1027]	[0.1031]	[0.1020]	[0.0989]	[0.0997]
hi_scho	0.2223	0.2052	0.2146	0.1134	0.1090
	[0.1706]	[0.1721]	[0.1709]	[0.1642]	[0.1660]
d_madra	-0.0381	-0.0348	-0.0612	-0.0324	-0.0504
	[0.1070]	[0.1075]	[0.1041]	[0.0994]	[0.0995]
bhu	0.1332	0.1053	0.1197	0.1273	0.1144
	[0.1726]	[0.1759]	[0.1759]	[0.1595]	[0.1660]
Susceptiblity to natural disasters					
dis_prone_vil	0.1198	0.1334	0.1042	0.1599	0.1477
	[0.1236]	[0.1248]	[0.1253]	[0.1267]	[0.1281]
Potentially endogenous variables					
dsf		0.1154			0.0105
		[0.0837]			[0.0900]
cbsch			0.1453		0.1137
			[0.1392]		[0.1247]
tba				0.3410***	0.3308***
				[0.0889]	[0.0880]
R-squared	0.261	0.270	0.273	0.359	0.366
F-statistics	2.533	2.166	2.361	2.922	2.578
Level of Significance	0.003	0.010	0.004	0.001	0.001

Notes: See Table 3. The narrower definition of a CO village is that the village has currently registered COs; the wider definition of a CO village is those villages listed as having a CO or similar activities in the PHKN village list or those villages that had initial contact with PHKN but villagers failed to form a CO.

Appendix Table 3. Correlates of program participation (wider definition of a CO village)

	Depedent variable: d_co3				
	Model 1	Model 2	Model 3	Model 4	Model 5
Demography					
lit_rate	0.0006	0.0015	0.001	0.0006	0.0017
	[0.0029]	[0.0031]	[0.0029]	[0.0030]	[0.0032]
vil_pop/1000	-0.0019	0.0025	0.0001	0.0073	0.0104
	[0.0370]	[0.0360]	[0.0342]	[0.0362]	[0.0331]
agri_prof_prc	0.0009	0.0007	0.0001	0.0009	0
	[0.0025]	[0.0024]	[0.0026]	[0.0024]	[0.0025]
Basic amenities, infrastructure, and shops					
irrigated_village	-0.0821	-0.0838	-0.1031	-0.1183	-0.1315
	[0.1216]	[0.1192]	[0.1185]	[0.1228]	[0.1177]
rd_length	-0.0079	-0.0082	-0.0074	-0.007	-0.0069
	[0.0055]	[0.0054]	[0.0056]	[0.0054]	[0.0055]
cln_drnk_wat	-0.0035**	-0.0036**	-0.0037**	-0.0041***	-0.0042***
	[0.0015]	[0.0014]	[0.0015]	[0.0015]	[0.0015]
gas	-0.2744	-0.2777	-0.3157*	-0.2614	-0.3042*
	[0.1909]	[0.1795]	[0.1896]	[0.1823]	[0.1782]
i_net	-0.0949	-0.0922	-0.0818	-0.1082	-0.0916
	[0.1575]	[0.1536]	[0.1525]	[0.1567]	[0.1545]
kar_shop	-0.2438*	-0.2421*	-0.2377*	-0.2649**	-0.2539**
	[0.1267]	[0.1292]	[0.1261]	[0.1200]	[0.1226]
Access to education and medical facilities					
prim_school	0.0619	0.0743	0.0607	0.0549	0.0636
	[0.1625]	[0.1651]	[0.1634]	[0.1645]	[0.1671]
mid_sch	-0.098	-0.0982	-0.1004	-0.1217	-0.1192
	[0.1103]	[0.1086]	[0.1099]	[0.1051]	[0.1045]
hi_scho	0.0422	0.0174	0.0316	-0.0225	-0.0362
	[0.1457]	[0.1493]	[0.1426]	[0.1500]	[0.1488]
d_madra	0.074	0.0787	0.0424	0.0774	0.0509
	[0.1102]	[0.1115]	[0.1100]	[0.1106]	[0.1125]
bhu	0.1383	0.0978	0.1199	0.1348	0.0908
	[0.1623]	[0.1654]	[0.1571]	[0.1590]	[0.1552]
Susceptiblity to natural disasters					
dis_prone_vil	0.3163*	0.3361*	0.2949*	0.3401**	0.3293*
	[0.1711]	[0.1848]	[0.1714]	[0.1611]	[0.1723]
Potentially endogenous variables					
dsf		0.1676			0.1154
		[0.1477]			[0.1572]
cbsch			0.1991		0.1827
			[0.1307]		[0.1275]
tba				0.2025*	0.1617
				[0.1102]	[0.1176]
R-squared	0.267	0.280	0.283	0.292	0.311
F-statistics	5.382	5.504	6.686	6.762	8.394
Level of Significance	0.000	0.000	0.000	0.000	0.000

Notes: See Table 3. The narrower definition of a CO village is that the village has currently registered COs; the wider definition of a CO village is those villages listed as having a CO or similar activities in the PHKN village list or those villages that had initial contact with PHKN but villagers failed to form a CO.

Appendix Table 4. Correlates of household consumption (household-level multiple regression results)
(Subsample excluding *T*-type households belonging to a male CO)

	Depedent variable:			
	tot_exp	exp_pc	food_pae	w_emp
Household demographic and asset characteristics				
hhsize	22.2272***	-2.8980***	-1.7029***	-0.0086
	[1.9373]	[0.3696]	[0.2933]	[0.0151]
fem_hh	-16.3655	0.8687	1.6481	0.093
	[9.9753]	[2.0317]	[1.8833]	[0.0986]
hh_edu	3.4891***	0.5457***	0.4352***	0.0236***
	[1.2577]	[0.1690]	[0.1399]	[0.0083]
hh_age	0.7845**	0.1282*	-0.022	-0.0005
	[0.3826]	[0.0665]	[0.0448]	[0.0038]
h_floor	34.3449	3.6806	4.3145**	-0.2673***
	[21.4397]	[2.8170]	[2.0549]	[0.0889]
drainge	7.231	0.9458	-0.085	0.0885
	[10.0679]	[1.3717]	[1.0723]	[0.0768]
land_val	-1.4197	-0.0102	-0.3138	-0.0169
	[4.2829]	[0.6038]	[0.3485]	[0.0258]
livestock_val	271.9248	27.5096	19.1742	0.6028
	[194.3375]	[18.9763]	[11.4958]	[0.6997]
fulltime_ehhm_no	13.2279**	1.2999	-1.4977**	-0.0189
	[5.6989]	[0.7717]	[0.7052]	[0.0378]
remittance	49.4871***	7.7358***	4.7934***	0.0261
	[12.8708]	[2.2688]	[1.6870]	[0.0837]
fldaffected_hh	-16.6806*	-3.1470*	-1.5507	0.0126
	[9.6085]	[1.5852]	[1.1284]	[0.0643]
Without PHKN treatment				
dummy for C_1	3.5264	0.0638	1.0546	-0.3308***
	[7.8281]	[1.5422]	[1.2611]	[0.0462]
dummy for C_2	58.5620***	9.8022***	7.4714***	-0.2530**
	[19.0078]	[3.0001]	[2.1671]	[0.1066]
Intercept	-16.5847	41.7141***	44.5137***	1.8745***
	[23.1413]	[4.7254]	[3.8168]	[0.2302]
R-squared	0.523	0.250	0.215	0.071
F-statistics	37.125	34.007	11.813	12.940
Level of Significance	0.000	0.000	0.000	0.000

Notes: See Table 10. The number of observations is 514.

Appendix Table 5. Correlates of human capital investment in children (individual-level regression results) (Subsample excluding *T*-type households belonging to a male CO)

	Dep.var = *wgt_ratio* (weight-for age), children aged 0-5		Dep.var = *d_enrol* (school enrollment), children aged 11-15	
	Girls	Boys	Girls	Boys
Household demographic and asset characteristics				
hhsize	0.004	0.0125	0.0217	0.0157*
	[0.0195]	[0.0092]	[0.0131]	[0.0090]
fem_hh	-0.0083	-0.0939	0.0752	-0.0559
	[0.0941]	[0.1028]	[0.0966]	[0.0957]
hh_edu	0.0036	-0.0021	0.0130**	0.0001
	[0.0070]	[0.0085]	[0.0062]	[0.0036]
hh_age	0.0004	-0.0036	-0.0059**	-0.0009
	[0.0025]	[0.0027]	[0.0027]	[0.0026]
h_floor	-0.0002	0.0866	0.0896	0.0412
	[0.0609]	[0.0581]	[0.0714]	[0.0246]
drainge	0.0774*	0.0249	-0.0021	-0.0049
	[0.0382]	[0.0558]	[0.0678]	[0.0318]
land_val	-0.012	-0.0181	-0.0364*	0.0075
	[0.0274]	[0.0185]	[0.0209]	[0.0050]
livestock_val	-0.1923	-0.244	0.5245	-0.1608
	[0.9774]	[0.3351]	[0.5075]	[0.1831]
fulltime_ehhm_no	-0.0337	0.0007	0.0002	-0.0366
	[0.0384]	[0.0263]	[0.0480]	[0.0288]
remittance	0.0008	-0.0109	0.0556	0.0516*
	[0.0939]	[0.0634]	[0.0718]	[0.0264]
fldaffected_hh	0.1081	0.0616	0.0678	0.0074
	[0.0717]	[0.0538]	[0.0444]	[0.0316]
No PHKN treatment				
dummy for C_1	0.0164	0.0023	-0.1595**	-0.0122
	[0.0792]	[0.0542]	[0.0654]	[0.0239]
dummy for C_2	0.0706	-0.0122	-0.0688	-0.0626
	[0.0814]	[0.0583]	[0.0706]	[0.0493]
Age controls	Polynomials upto the 5th, age in months		Full set of age (in years) dummies	
R-squared	0.118	0.257	0.258	0.077
F-statistics	7.981	3.739	6.675	2.394
Level of Significance	0.000	0.001	0.000	0.016
Number of observations	95	97	174	177

Notes: See Table 12.